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Aptima, Inc.
12 Gill Street, Suite 1400
Attn: Patents/Jay Brooks
Woburn, MA 01801

EXAMINER
HULL, JAMES B

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte E. WEBB STACY and JOHN COLONNA-ROMANO

_____

Appeal 2019-003578
Application 13/502,120
Technology Center 3700

_____

Before JENNIFER S. BISK, AMEE A. SHAH, and
ROBERT J. SILVERMAN, *Administrative Patent Judges*.

SHAH, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), the Appellant[1] appeals from the
Examiner's decision to reject claims 1–5 and 7–22. We have jurisdiction
under 35 U.S.C. § 6(b).

We AFFIRM IN PART.

_____

[1] We use the word "Appellant" to refer to "applicant" as defined in
37 C.F.R. § 1.42. The Appellant identifies the real party in interest as
Aptima, Inc. Appeal Br. 4.

CLAIMED SUBJECT MATTER

The Appellant's "invention relates to simulated environments, in particular to simulation environments that utilize scenarios," for example, "[i]mmersive scenarios, such as those found in military exercises and computer-based games, [that] are often viewed as a sequence of discrete partially scripted events." Spec. ¶¶ 5, 7.

Claims 1, 9, 10, and 18 are the independent claims on appeal. Claims 1 and 10, reproduced below, with bracketed notations and paragraphing added, are illustrative of the claimed subject matter.

> 1. A method of defining a scenario of conditions for a computer based simulator, said method comprising the steps of:
>
> [(a)] an assignment model receiving a plurality of conditions for at least one objective;
>
> at least one of the plurality of conditions being represented by at least one constraint;
>
> the at least one constraint comprises a mathematical expression having at least one variable representing a plurality of values of the at least one constraint whereby the at least one of the plurality of conditions can be represented by the plurality of values of the at least one constraint;
>
> the mathematical expression implemented in a computer program to be executed with a processor;
>
> [(b)] the assignment model communicating at least one of the plurality of conditions to a scheduling model;
>
> [(c)] the scheduling model scheduling, with a processor, at least one of the plurality of conditions to define the scenario of conditions for a computer based simulation environment by satisfying the at least one objective given the at least one constraint;

the computer based simulation environment comprises a plurality of networked computer based simulators;

whereby the scenario of conditions comprises at least one of the plurality of conditions for each of the networked computer based simulators;

[(d)] the scheduling model communicating at least one of the plurality of conditions to the computer based simulation environment;

[(e)] receiving an actual value of the at least one variable of the at least one constraint from one of the plurality of networked computer based simulators;

whereby the actual value represents an actual constraint value from a user of one of the plurality of networked computer based simulators;

[(f)] the scheduling model rescheduling at least one of the plurality of conditions to define an updated scenario of conditions for the computer based simulation environment by satisfying the at least one objective given the at least one constraint and the actual constraint value; and

whereby the updated scenario of conditions comprises at least one of the plurality of conditions for each of the networked computer based simulators.

Appeal Br. 38–39 (Claims App.).

10. A computer based method of monitoring a user on a scenario of conditions, said method comprising:

[(a)] presenting a scenario of conditions to a user interface of a computer based simulator;

the scenario of conditions comprising a plurality of conditions for at least one objective;

at least one of the plurality of conditions being represented by at least one constraint;

the at least one constraint comprises a mathematical expression having at least one variable representing a plurality of values of the at least one constraint whereby the at least one of the plurality of conditions can be represented by the plurality of values of the constraint;

the mathematical expression implemented in a computer program;

[(b)] monitoring an execution of the user of the at least one of the plurality of conditions of the user interface of the computer based simulator;

[(c)] determining, with a processor, at least one actual constraint value of the at least one of the plurality of conditions based on the execution of the user; and

[(d)] determining whether the actual constraint value satisfies the at least one of the plurality of conditions.

Id. at 40–41 (Claims App.)

As explained below, we analyze independent claim 10 separately from independent claims 1, 9, and 18.

THE REJECTION

Claims 1–5 and 7–22 stand rejected under 35 U.S.C. § 101 as being directed to a judicial exception without significantly more.

OPINION

35 U.S.C. § 101 Framework

A. Section 101

An invention is patent-eligible if it claims a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. However, the U.S. Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: "[l]aws of nature, natural phenomena, and

abstract ideas" are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Court's two-part framework, described in *Mayo* and *Alice*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first determine what concept the claim is "directed to." *See Alice*, 573 U.S. at 219 ("On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.,* the use of a third party to mitigate settlement risk."); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) ("Claims 1 and 4 in petitioners' application explain the basic concept of hedging, or protecting against risk.").

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); "tanning, dyeing, making waterproof cloth, vulcanizing India rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1853))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Court held that "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula."

Diehr, 450 U.S. at 187; *see also id.* at 191 ("We view respondents' claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula."). Having said that, the Court also indicated that a claim "seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." *Id.* (citation omitted) (citing *Benson* and *Flook*); *see, e.g., id.* at 187 ("It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221 (quotation marks omitted). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* (alterations in original) (quoting *Mayo*, 566 U.S. at 77). "[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

B. USPTO Section 101 Guidance

In January 2019, after the Final Action was mailed and the Appeal Brief entered, but before the Answer was mailed and the Reply Brief entered, the U.S. Patent and Trademark Office (USPTO) published revised guidance on the application of § 101. 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) ("2019 Revised

Guidance").[2] "The guidance sets out agency policy with respect to the

USPTO's interpretation of the subject matter eligibility requirements of

35 U.S.C. § 101 in view of decisions by the Supreme Court and the Federal

Circuit." *Id.* at 51. Although "[a]ll USPTO personnel are, as a matter of

internal agency management, expected to follow the guidance," the guidance

"does not create any right or benefit, substantive or procedural, enforceable

by any party against the USPTO." *Id.*; *see also* October 2019 Update at 1.

The 2019 Revised Guidance, by its terms, applies to all applications, and to

all patents resulting from applications, filed before, on, or after January 7,

2019. *Id.* at 50.[3]

Under the 2019 Revised Guidance and the October 2019 Update, we

first look to whether the claim recites: (1) any judicial exceptions, including

certain groupings of abstract ideas (i.e., mathematical concepts, certain

methods of organizing human activity such as a fundamental economic

practice, or mental processes) ("Step 2A, Prong One"); and (2) additional

elements that integrate the judicial exception into a practical application (*see*

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[2] In response to received public comments, the Office issued further
guidance on October 17, 2019, clarifying the 2019 Revised Guidance.
USPTO, *October 2019 Update: Subject Matter Eligibility* (the "October
2019 Update") (available at https://www.uspto.gov/sites/default/files/
documents/peg_oct_2019_update.pdf).

[3] The 2019 Revised Guidance supersedes MPEP § 2106.04(II) and also
supersedes all versions of the USPTO's "Eligibility Quick Reference Sheet
Identifying Abstract Ideas." *See* 2019 Revised Guidance, 84 Fed. Reg. at 51
("Eligibility-related guidance issued prior to the Ninth Edition, R-08.2017,
of the MPEP (published Jan. 2018) should not be relied upon.").

MPEP § 2106.05(a)–(c), (e)–(h) (9th ed. Rev. 08.2017, Jan. 2018)) ("Step 2A, Prong Two").[4] 2019 Revised Guidance, 84 Fed. Reg. at 52–55.

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look, under Step 2B, to whether the additional elements, individually or in combination, provide an inventive concept. *Id.* Among the considerations in determining whether the additional elements, individually or in combination, amount to significantly more than the exception itself, we look to whether they add a specific limitation beyond the judicial exception that is not "well-understood, routine, conventional" in the field or simply append well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception. *Id.* at 56.

Claims 1–5, 7–9, and 18–22

Step One of the *Mayo*/*Alice* Framework

Under the first step of the *Mayo*/*Alice* framework and steps 1 and 2A of USPTO guidance, the Examiner determines that independent claim 1 is directed to a method, one of the statutory categories, reciting

> an abstract idea comprising: receiving a plurality of conditions
> . . . ; scheduling . . . at least one of the plurality of conditions to
> define scenarios of conditions for a simulation environment . . . ;

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[4] This evaluation is performed by (a) identifying whether there are any additional elements recited in the claim beyond the judicial exception, and (b) evaluating those additional elements individually and in combination to determine whether the claim as a whole integrates the exception into a practical application. *See* 2019 Revised Guidance - Section III(A)(2), 84 Fed. Reg. 54–55.

> communicating at least one of the plurality of conditions to the simulation environment; . . . receiving an actual value of the at least one variable of the at least one constraint . . . ; [and] rescheduling at least one of the plurality of conditions to define an updated scenario of conditions.

Final Act. 2–3. The Examiner characterizes the claimed concept as an abstract idea similar to a "process of organizing human activity found to be abstract in *Alice*, as it is capable of being performed by human analog (i.e., by mental steps and/or pen and paper)," as well an abstract idea similar to "collecting information, analyzing it, and displaying certain results of the collection and analysis determined to be abstract in *Electric Power Group*[*, LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016)]," and an abstract idea similar to "obtaining and comparing intangible data determined to be abstract in *CyberSource* [*Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366 (Fed. Cir. 2011)]." *Id.* at 3. The Examiner further finds that the limitation recited in limitation (a) of at least one of the plurality of conditions being represented by at least one constraint, that comprises a mathematical expression having at least one variable representing a plurality of values of the at least one constraint, and represented by the plurality of values of the at least one constraint "is an abstract idea similar to the concepts that have been identified as abstract by the courts, such as organizing information through mathematical correlations in *Digitech* [*Image Tech., LLC v. Electronics for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014)] or data recognition and storage in *Content Extraction* [*and Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343 (Fed. Cir. 2014)]." *Id.* Applying the 2019 Revised Guidance Step 2A, Prong One (84 Fed. Reg. at 52–54), the Examiner determines that the claim's limitations recite abstract ideas falling within each of the enumerated categories, i.e., a mental process, a method of

organizing human activities of "of managing interactions between people in the area of scheduling based on rules or instructions," and a mathematical concept. Ans. 7.

The Examiner also determines that the limitations, alone or in combination, do not improve "the functioning of a computer or improve[] any other technology." Final Act. 4. Applying the 2019 Revised Guidance, the Examiner determines under Step 2A, Prong Two (84 Fed. Reg. at 55) that claim 1 "do[es] not integrate the judicial exception into a practical application." Ans. 8 (emphases omitted). Specifically, the Examiner determines that the "additional elements, including a processor for performing the recited steps in a computer environment (e.g., models), and including networked computer based simulators . . . are recited at a high level of generality," and that the "generic computer limitations are no more than mere instructions to apply the exception using generic computer components." *Id.* The Examiner further determines that "[t]he claim as a whole merely describes how to apply the concept of defining a scenario of conditions in a computer environment, but there is no apparent improvement to the underlying functionality of the generic computer, as the steps are recited in a result-based manner" and the elements "generally link[] the use of the judicial exception to a particular technological environment, i.e., computer based simulation environment." *Id.* The Examiner also determines that "[i]n contrast to *Enfish*[*, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016))], the claim is focused on the abstract idea, not the functionality of the computer system." Final Act. 3.

The Appellant contends that "claim [1] is directed to defining a scenario of conditions for a computer based simulation environment"

(Appeal Br. 16) that is not a method of organizing human activity or a
mental process (*see id.* at 15–16). The Appellant contends that "claim 1 is
directed to a technical solution that (i) improves computer based simulators
like those claims found eligible in *Enfish* and (ii) performs a distinct process
to automate a task similar to the patent-eligible subject matter of *McRO*."
Id. at 17 (citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir.
2016) and *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299
(Fed. Cir. 2016)). Under the 2019 Revised Guidance, the Appellant
contends (*see id;* Reply Br. 2–4) that under Step 2A, Prong One, claim 1
does not recite an abstract idea, and under Prong Two, the elements of the
claim integrate the abstract idea into a practical application because the
combination of the elements "reflects an improvement in the functioning of
a computer, or an improvement to other technology or technical field" (84
Fed. Reg. at 55).

After careful review of the record before us, we do not sustain the
rejection of claims 1–5, 7–9, and 18–22, for the reasons provided below.

The Specification provides for "SYSTEMS AND METHODS TO
DEFINE AND MONITOR A SCENARIO OF CONDITIONS." Spec.,
Title. In the "BACKGROUND OF THE INVENTION" section, the
Specification states the "invention relates to simulated environments, in
particular to simulation environments that utilize scenarios." *Id.* ¶ 5.
Although the Specification "focuses on methods and systems that define and
monitor educational and training scenarios, the systems and methods
disclosed herein have wide applicability," such as "project planning or
task/resource allocation as well as any educational system such a specifically
programmed computer based learning system." *Id.* ¶ 42.

The Specification discusses that "[i]mmersive scenarios, such as those found in military exercises and computer-based games, are often viewed as a sequence of discrete partially scripted events." *Id.* ¶ 7. In military exercises, these scripted events "may be found in a planning document called the Master Scenario Events List (MSEL)," with each scripted MSEL involving "specific conditions and actions by specific live, virtual, or constructive entities," . . . the conditions and actions tak[ing] place at specific virtual locations at specific scenario times." *Id.* "Computer-based games are scripted similarly." *Id.* The Specification discusses that although known scenario definition languages are "designed to provide high fidelity detail," they "generally fail to define clearly the linkages between scenario events and training objectives." *Id.* ¶ 8; *see also id.* ¶ 43. Further, "[i]n the conventional scenario, circumstances can often make it impossible for the actual sequence of events to match the planned sequence of events." *Id.* ¶ 45. "The challenge of scheduling the training objective instances is that many of them are dependent on each other. So, a brute force approach is to just try all combinations of values for each of potential time value. This is computationally difficult." *Id.* ¶ 71.

Thus, the invention "determine[s] and monitor[s] a scenario of conditions to provide a way to view scenarios comprising a partially ordered collection of partially specified conditions and actions by relaxing these scenario conditions (when possible) in order to gain flexibility in sequencing, scheduling, positioning, monitoring and replaying scenario events or conditions." *Id.* ¶ 10; *see also id.* ¶ 43. The invention's scenarios "provide wider latitude for accommodating the unexpected," such that "[i]f unexpected events make it impossible to meet the MSEL-based

requirements, there is still a chance that the [invention's] . . . requirements can be met, because they are considerably less demanding although still pedagogically rigorous." *Id.* ¶ 45. The invention's "approach differs from earlier work in constraint programming in that it is focused on attempting to schedule conditions that can optimize a set of events such as working on training objectives or advancing the plot line, and not on maximizing the throughput of a system, as would be the case for job-shop or workflow applications." *Id.* ¶ 47. As such, with the invention's approach,

> it is possible to address a variety of goals such as minimizing the length of the scenario, maximizing the number of training objectives, maximizing a certain number of conditions required for each event, maximizing the total value of all events given a value for each event, and a large number of other sensible goals.

Id. The claimed method further "allows trainers to create training objective focused scenarios more quickly than conventional methods." *Id.* ¶ 48.

Consistent with this disclosure, claim 1 recites "[a] method of defining a scenario of conditions for a computer based simulator." Appeal Br. 38 (Claims App.). We consider claim 1 as a whole[5] giving it the broadest reasonable construction[6] as one of ordinary skill in the art would have interpreted it in light of the Specification[7] at the time of filing. The method of claim 1 comprises the steps of: receiving information, i.e.,

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[5] "In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered as a whole." *Diehr*, 450 U.S. at 188.

[6] 2019 Revised 101 Guidance, page 52, footnote 14 ("If a claim, under its *broadest reasonable interpretation* . . .") (emphasis added).

[7] "First, it is always important to look at the actual language of the claims. . . . Second, in considering the roles played by individual limitations, it is important to read the claims 'in light of the specification.'" *Smart Sys.*

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[(a)] an assignment model receiving a plurality of conditions for at least one objective;

at least one of the plurality of conditions being represented by at least one constraint;

the at least one constraint comprises a mathematical expression having at least one variable representing a plurality of values of the at least one constraint whereby the at least one of the plurality of conditions can be represented by the plurality of values of the at least one constraint;

the mathematical expression implemented in a computer program to be executed with a processor; [and]

[(e)] receiving an actual value of the at least one variable of the at least one constraint from one of the plurality of networked computer based simulators;

whereby the actual value represents an actual constraint value from a user of one of the plurality of networked computer based simulators;

communicating information, i.e.,

[(b)] the assignment model communicating at least one of the plurality of conditions to a scheduling model; [and]

[(d)] the scheduling model communicating at least one of the plurality of conditions to the computer based simulation environment;

and scheduling and rescheduling conditions, i.e.,

[(c)] the scheduling model scheduling, with a processor, at least one of the plurality of conditions to define the scenario of conditions for a computer based simulation environment by satisfying the at least one objective given the at least one constraint;

Innovations, LLC v. Chicago Transit Authority, 873 F.3d 1364, 1387 (Fed. Cir. 2017) (J. Linn, dissenting in part and concurring in part), citing *Enfish*, 822 F.3d at 1335, among others.

the computer based simulation environment comprises a plurality of networked computer based simulators;

whereby the scenario of conditions comprises at least one of the plurality of conditions for each of the networked computer based simulators; [and]

[(f)] the scheduling model rescheduling at least one of the plurality of conditions to define an updated scenario of conditions for the computer based simulation environment by satisfying the at least one objective given the at least one constraint and the actual constraint value; and

whereby the updated scenario of conditions comprises at least one of the plurality of conditions for each of the networked computer based simulators.

The Specification discusses that the claim uses mathematical expressions "to model aspects of scenarios and conditions" so that "tools such as constraint programming can be used as a means to automatically define the scenarios . . . [and] to monitor, manage and optimize the progress of a user through the training scenario." Spec. ¶ 46. Scheduling and rescheduling conditions are described in the Specification as "'fit[ting]' training objectives into either the scenario as it is being planned or into a training exercise as it is being conducted." *Id.* ¶ 66. This is done by feeding all of the training objective conditions to a mathematical constraint programming application that satisfies or optimizes the conditions by "intelligently pick[ing] some of the values for the [training objective] slots and then us[ing] those values to limit the choices for the values of the other slots (based on the defined conditions or constraints)." *Id.* ¶ 72. The applications "implement a type of constraint-based local search, in which an initial solution is found, and then a local search is performed for modifications that will be more optimal." *Id.* ¶ 73. The Specification

describes the scheduling and rescheduling approach in Figure 9 and at paragraphs 73 through 79 as generating clusters, generating feasible training objective list, and generating a schedule. Generating a schedule is performed by an algorithm taking into account source information, resource constraints, priority of objectives, and duration of the objective. *Id.* ¶ 78.

When considered collectively and under the broadest reasonable interpretation, the limitations of claim 1 recite a method for modeling and defining a scenario of conditions implemented in a computer based simulation environment. The question is whether this claimed method is an abstract idea. In our analysis, we are mindful to not parse the claim. *See* October 2019 Update 2. Thus, although the claim recites the use of a mathematical expression, i.e., a mathematical constraint, the method of modeling and defining a scenario of conditions is not simply reciting a mathematical concept, reducing the scenario to a mathematical formula, or organizing information through mathematical correlations, but is using a mathematical concept in the process. *See Diehr*, 450 U.S. at 187 *and* October 2019 Update 3; c*f. Bilski*, 561 U.S. at 611 (reducing the concept of hedging to mathematical principles is an abstract idea); *Flook*, 437 U.S. at 594 (discovering a mathematical formula is patent-ineligible); *and Digitech*, 758 F.3d at 1350–51 (claim of generating and combining data that does not require input from a physical device is patent-ineligible). Similarly, although the uses of the invention encompass training exercises and games, the claim does not "manage personal behavior or relationships of interactions between people" by providing set of rules or series of instructions for the exercise or game, nor does it recite a fundamental activity humans have been performing. *Cf. In re Smith*, 815 F.3d 816, 818

(Fed. Cir. 2016) (rules for conducting a wagering game is an abstract idea) *and Voter Verified, Inc. v. Election Sys. & Software LLC*, 887 F.3d 1376, 1385 (Fed. Cir. 2018).

The Examiner determines that the claim recites the abstract idea of a mental process because "nothing in the claimed elements preclude the steps or tasks from practically being performed in the mind." Ans. 7; *see also* Final Act. 3 (citing *Electric Power Group* and *CyberSource*). However, when looking at the claim in its entirety, we do not readily see, and the Examiner has not adequately explained, how the claim recites "the user manually defining a scenario of conditions" (Ans. 7), and how the particular steps of scheduling and rescheduling could "practically be[] performed in the mind" (*id.*) such that they comprise a mental process. *See* Reply Br. 5–6 (arguing "the claim canno[t] be performed practically in the human mind.").

Although the Specification states "[f]or any one training objective for any one trainee, it is often the case that bringing about the required conditions (that is, satisfying the constraints) is easy even without automation" (Spec. ¶ 71), the Specification distinguishes the claimed invention from those types of processes that can be performed "without automation," i.e., mentally. Specifically, the Specification discusses that "satisfying the constraints that represent the combination of training objective conditions for all trainees is extremely difficult." *Id.* When there is no solution that satisfies all the constraints, "what is needed is a solution that satisfies as many high-priority conditions as possible." *Id.* Here, claim 1 recites scheduling a condition to define a scenario comprising at least one condition for each of a plurality of networked computer based simulators "by satisfying the at least one objective given the at least one

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constraint" for a plurality of computer based simulators. Thus, the claim addresses the more difficult problem of satisfying constraints of a combination of objectives from multiple simulators, i.e., a combination of training objectives for all trainees. It is not clearly evident that this more difficult process, with its use of its mathematical constraint, "constraint programming," and scheduling and rescheduling, is one that can be performed mentally or manually. *See CardioNet, LLC v. InfoBionic, Inc.*, 955 F.3d 1358, 1371 (Fed. Cir. 2020) ("it is difficult to fathom how doctors mentally or manually used 'logic to identify the relevance of the variability [in the beat-to-beat timing] using a non-linear function of a beat-to-beat interval' as required by claim 10."). Thus, it is not apparent that, under the 2019 Revised Guidance Step 2A, Prong One, the claim recites an abstract idea of a mental process.

However, even assuming *arguendo* that claim 1 recites the less difficult process (with one objective and one trainee) that possibly can be performed mentally, and thus recites an abstract idea, we agree with the Appellant that the claim is not directed to that abstract idea; rather, its focus is on a specific means to improve simulation technology, i.e., the claim integrates the judicial exception into a practical application, as the term is used in the 2019 Revised Guidance, Step 2A, Prong Two (84 Fed. Reg. at 54–55).

The Federal Circuit has explained that "the 'directed to' inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether 'their character as a whole is directed to excluded subject matter.'" *Enfish.*, 822 F.3d at 1335 (quoting *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015)). It asks whether the

focus of the claims is on a specific improvement in relevant technology or on a process that itself qualifies as an "abstract idea" for which computers are invoked merely as a tool. *See id.* at 1335–36. Here, it is clear from the Specification, including the claim language, that claim 1 focuses on a purported improvement to a technical field.

As discussed above, the Specification makes clear that the invention's scenarios address the prior art problem of "computer based simulators . . . accommodat[ing] multiple conditions of a training scenario in large-scale computer based simulation environments." Appeal Br. 17; *see also* Spec. ¶ 71. The purported solution allows for "wider latitude for accommodating the unexpected," such that if unexpected events make it impossible to meet the MSEL-based requirements for the simulations to occur, the invention's requirements may still be met, "because they are considerably less demanding although still pedagogically rigorous" (Spec. ¶ 45), allowing for the simulation to occur (*see id.*) and for a more effective training experience (*id.* ¶ 48). More specifically, "[b]y representing the[] types of objective conditions as mathematical constraints, it is possible to represent the conditions more flexibly, such as in a mathematical range, that can more accurately represent methods to meet the objective or to better satisfy a group of objectives." *Id.* ¶ 51. We agree with the Appellant that the combination of representing conditions as constraints that are mathematical expressions and scheduling and rescheduling the conditions for the simulations comprises additional elements that "allow[] the scenario planning and execution in simulators to be more flexible and more effective than conventional solutions (see Spec. at least at paras. [0045]-[0048] and [0071]-[0072])." Appeal Br. 19.

We acknowledge that the claimed computer elements of assignment and scheduling models, a computer program, a processor, and networked simulators are described in the Specification as generic computer elements or off-the-shelf products. *See* Spec. ¶¶ 91–95. However, we agree with the Appellant (*see* Appeal Br. 17–19; Reply Br. 5–6) that the claim here is akin to those of *McRO* where the court held "[i]t is the incorporation of the claimed rules, not the use of the computer, that 'improved [the] existing technological process' by allowing the automation of further tasks." 837 F.3d at 1314 (alteration in original) (quoting *Alice*, 573 U.S. at 223). Here, it is similarly the incorporation of the mathematical constraints and the scheduling and rescheduling based on the constraints that reflect a purported improvement to the technical field of computer based modeling of scenarios, even though the claim does not recite a limitation for performing the scenario simulation.

Accordingly, we conclude that, under the first step of the *Mayo/Alice* framework and Step 2A of the 2019 Revised Guidance, claim 1 is not directed to an abstract idea but to an improvement to the technical field of computer based modeling of scenarios. We thus do not reach the second step of the *Mayo/Alice* framework and Step 2B of the USPTO Guidance. *See McRO*, 837 F.3d at 1316; *CardioNet*, 955 F.3d at 1371.

Thus, we do not sustain the Examiner's rejection of independent claim 1 and of claims 2–5, 7, 8, 21, and 22, which depend therefrom. Independent claims 9 and 18 recite limitations substantially similar to those of independent claim 1, and for the same reasons we do not sustain the rejection of claim 1, we also do not sustain the rejection of independent claims 9 and 18 and of claims 19 and 20, which depend from claim 18.

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Claims 10–16

Failure to Apply the *Mayo/Alice* Framework

We first address the Appellant's arguments that the Examiner fails to make a prima facie case and does not properly apply the "steps" of the "*Mayo Test*." Appeal Br. 32–37; *see also* Reply Br. 2. We are not persuaded of Examiner error by this argument.

Here, the Examiner applies the Supreme Court's two-step framework, described in *Mayo* and *Alice*, and considers Office guidelines (in effect at the time) in that application. *See* Final Act. 6–11; Ans. 3–9 (applying the 2019 Revised Guidance). Specifically, the Examiner notifies the Appellant to what abstract idea the Examiner considers the claims recite (*see* Final Act. 7; Ans. 4–7) and why the claims are directed to that abstract idea (*see* Ans. 8). The Examiner further considers the claimed elements individually and as an ordered combination and notifies the Appellant why the claims do not provide an inventive concept that transforms the abstract idea into a patent-eligible invention. *See* Final Act. 7–9; Ans. 8–9. Thus, the Examiner has notified the Appellant of the reasons for the rejection in a sufficiently articulate and informative manner as to meet the notice requirement of 35 U.S.C. § 132. *See In re Jung*, 637 F.3d 1356, 1362 (Fed. Cir. 2011).

Step One of the *Mayo/Alice* Framework

Under the first step of the *Mayo/Alice* framework and steps 1 and 2A of USTPO guidance, the Examiner determines that independent claim 10 is directed to a method, one of the statutory categories, reciting

> an abstract idea comprising: presenting a scenario of conditions
> to a user interface of a simulator . . . ; monitoring an execution of
> the user of the at least one of the plurality of conditions . . . ;

> determining at least one actual constraint value of the at least one
> of the plurality of conditions based on the execution of the user
> . . . ; and determining whether the actual constraint value satisfies
> the at least one of the plurality of conditions.

Final Act. 7. The Examiner makes the same determinations regarding USTPO guidance step 2A for claim 10 as for claim 1. *See id.* Specifically applying the 2019 Revised Guidance Step 2A, Prong One (84 Fed. Reg. at 52–54), the Examiner determines that the claim "recites limitations that are akin to organizing human activity, mental processes and mathematical concepts," i.e., that the claim's limitations recite abstract ideas falling within each of the enumerated categories. Ans. 24.

The Examiner also determines that claim 10's "recited computer system may include a general purpose computer (see Applicant's specification at paragraph 0093 describing computer system as general purpose)." Final Act. 8. Further, the limitations, alone or in combination, do not

> provide improvement to another technology, technical field;
> improvements to the functioning to the computer itself; apply the
> judicial exception with, or by use of, a particular machine; effect
> a transformation or reduction of a particular article to a different
> state or thing; a specific limitation other than what is well-
> understood, routine and conventional in the field, or add
> unconventional steps that confine the claim to a particular useful
> application; and other meaningful limitations beyond generally
> linking the use of the judicial exception to a particular
> technological environment.

Id. Applying the 2019 Revised Guidance, the Examiner determines under Step 2A, Prong Two (84 Fed. Reg. at 55) that claim 1 "do[es] not integrate the judicial exception into a practical application." Ans. 8 (emphases omitted).

The Appellant contends that "claim 10 is directed to <u>monitoring</u> a user of a computer based simulator which is neither an interpersonal or an intrapersonal activity [and] . . . submits that the methods address the human operation of machines which is specifically excluded from 'organizing human activity.'" Appeal Br. 31.   The Appellant contends

> claim 10 includes a "concrete" embodiment in that the claim recites an embodiment of presenting conditions to a user interface and monitoring a user on a scenario of training events (conditions) in a computer based simulator so that a determination can be made whether the user's performance satisfies the event.

Id. at 17. Under the 2019 Revised Guidance, the Appellant contends that "when taken as a whole, as similarly argued above regarding claim 1, claim 10 at least is not 'capable of being performed by human analog' and is not similar to any of the grouping of abstract ideas in the 2019 [Revised Guidance]." Reply Br. 7.

After careful review of the record before us, we sustain this rejection.

As the Appellant states, "[i]ndependent claim 10 recites a different embodiment than that of claim 1." Appeal Br. 30. Unlike claim 1, claim 10 does not recite combining a use of the constraints with scheduling and rescheduling the conditions for the simulations, which we determined above that in combination are unlikely capable of being performed mentally, as claimed in claim 1, and are directed to a purported improvement in the technical field of simulation. Instead, claim 10 recites a "computer based method of monitoring a user on a scenario of conditions." The claimed method comprises the steps of: displaying information, i.e.,

> [(a)] presenting a scenario of conditions to a user interface of a computer based simulator;

the scenario of conditions comprising a plurality of conditions for at least one objective;

at least one of the plurality of conditions being represented by at least one constraint;

the at least one constraint comprises a mathematical expression having at least one variable representing a plurality of values of the at least one constraint whereby the at least one of the plurality of conditions can be represented by the plurality of values of the constraint;

the mathematical expression implemented in a computer program;

monitoring information, i.e.,

[(b)] monitoring an execution of the user of the at least one of the plurality of conditions of the user interface of the computer based simulator; and

and determining information, i.e.,

[(c)] determining, with a processor, at least one actual constraint value of the at least one of the plurality of conditions based on the execution of the user; and

[(d)] determining whether the actual constraint value satisfies the at least one of the plurality of conditions.

Although the preamble states the method is "computer based," the claim does not recite any computer component(s) that performs steps (a), (b), and (d) of presenting, monitoring, and determining whether the value satisfies a condition. The Specification at paragraph 80 discusses a "need to monitor progress against planned training objective conditions during the exercise," and at paragraph 81 discusses that "monitoring may be integrated into the software training program." Figure 10 "shows an example" of the described monitoring tool that can "identify conditions for emergent training objectives" to notify the instructor so as to allow them to take action. Spec.

¶ 82. There are no claimed details on how the constraint value is determined based on the execution of the user such that it cannot be done mentally.

When considered collectively and under the broadest reasonable interpretation, the limitations of claim 10 recite a method for monitoring a user by presenting scenarios to a user, monitoring scenario conditions, and determining information about the user's performance, based on the monitoring.[8] Here, it is clear that, consistent with the Examiner's characterization, monitoring a user is an abstract idea of a "[c]ertain method[] of organizing human activity — . . . managing personal behavior or relationships or interactions between people (including social activities, teaching, and following rules or instructions)" and a "[m]ental process[] — [a] concept performed in the human mind (including an observation, evaluation, judgment, opinion)." 2019 Revised Guidance, 84 Fed. Reg. at 52.

Our reviewing courts have held similar concepts to be abstract. For example, the courts have held abstract the concepts of routing information by sending, directing, monitoring, and accumulating information and of "monitoring the delivery of real-time information" in *Two-Way Media Ltd. v. Comcast Cable Comm'ns. LLC*, 874 F.3d 1329, 1337, 1340 (Fed. Cir. 2017), of detecting events, i.e., monitoring, an electric grid by collecting, analyzing, and displaying information in *Electric Power Grp.*, 830 F.3d at 1351–54, of monitoring audit log data of user behavior in *FairWarning IP,*

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[8] We note that "[a]n abstract idea can generally be described at different levels of abstraction." *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1240 (Fed. Cir. 2016). The Board's "slight revision of its abstract idea analysis does not impact the patentability analysis." *Id.* at 1241.

LLC v. Iatric Sys., Inc., 839 F.3d 1089, 1097 (Fed. Cir. 2016), and of using a mathematical formula to monitor and adjust alarms in *Flook*, 437 U.S. at 594.

The Appellant argues that claim 10, like claim 1, is "not 'capable of being performed by human analog.'" Reply Br. 7. However, the Specification supports the Examiner's determination that the steps of claim 10 can be performed by a human "in the mind and/or using pen and paper" (Ans. 25) in disclosing, for example, that a human trainer or operator can "monitor performance, give condition satisfaction status and provide corrective guidance while encountering scenario conditions or events such as a group of conditions or a series of conditions" (Spec. ¶¶ 10, 44) and that "the instructor can monitor the runtime environment" (*id.* ¶ 104). Except for the processor determining a constraint value, the claim does not require a computer component to perform the functions of presenting, monitoring, and determining whether the value satisfies a condition.

Having concluded that claim 10 recites a judicial exception under 2019 Revised Guidance, Step 2A, Prong One, we next consider whether the claim recites additional elements that integrate the judicial exception into a practical application. It does not.

We look to whether the claim "appl[ies], rel[ies] on, or use[s] the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the judicial exception," i.e., "integrates a judicial exception into a practical application." 2019 Revised Guidance, 84 Fed. Reg. at 54. Here, the only additional elements recited in claim 10 beyond the abstract idea are the "user interface," "computer program," "computer based

simulator," and "processor" — elements that, as the Examiner observes (*see* Final Act. 8; Ans. 8), are described in the Specification as generic computer and off-the shelf components (*e.g.* Spec. ¶¶ 91–95).

We find no indication in the Specification, nor does the Appellant direct us to any indication, that the operations recited in claim 10 require any specialized computer hardware or other inventive computer components, i.e., a particular machine, invoke any asserted inventive programming, or that the claimed invention is implemented using other than generic computer components to perform generic computer functions. *See DDR Holdings*, 773 F.3d at 1256 ("[A]fter *Alice*, there can remain no doubt: recitation of generic computer limitations does not make an otherwise ineligible claim patent-eligible."). We also find no indication in the Specification that the claimed invention as recited in claim 10 effects a transformation or reduction of a particular article to a different state or thing.

In contrast to claim 1 where the combination of the use of the constraints with scheduling and rescheduling the conditions for the simulations addresses a prior art problem of computer based simulators and reflects a purported improvement to the technical field of computer based modeling of scenarios for simulations (*see supra*), claim 10 does not recite a solution to a technical problem nor any other improvement to technology or a technical field. Here, claim 10 presents a scenario of conditions, monitors an execution, and determines a value and whether the value satisfies a condition, which, unlike the use of constraints in scheduling and rescheduling to define scenarios in claim 1, are not tied to achieving any purported solution.

Here, the "focus" of claim 10 is not "on the specific asserted improvement" (*Enfish,* 822 F.3d at 1335) to the technical field of modeling of scenarios, but rather on using the components as tools to implement the abstract idea of monitoring a user in the particular field of computer based simulations. *See Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1259 (Fed. Cir. 2016) ("The Supreme Court and [the Federal Circuit] have repeatedly made clear that merely limiting the field of use of the abstract idea to a particular existing technological environment does not render the claims any less abstract."). The computer components operate in their ordinary manners to present information, implement a mathematical expression, and determine a constraint value.

The Appellant contends that "independent claim 10 recites a concrete and useful result" in including "a 'concrete' embodiment in that the claim recites an embodiment of presenting conditions to a user interface and monitoring a user on a scenario of training events (conditions) in a computer based simulator so that a determination can be made whether the user's performance satisfies the event." Appeal Br. 31. However, these elements, i.e., presenting conditions, monitoring a user, and making determinations, are elements that are part of the abstract idea. Any improvement in these limitations lies in the abstract idea itself, i.e., to monitoring a user, and not to any technological improvement or to a purported improvement to the technical field of modeling for simulation, in contrast to claim 1.

Thus, we are not persuaded of error in the Examiner's determination that claim 10 is directed to an abstract idea.

Step Two of the *Mayo/Alice* Framework

Under the second step in the *Alice* framework and USTPO guidance Step 2B, we find supported the Examiner's determination that claim 10's limitations, taken individually or as an ordered combination, do not amount to significantly more than the judicial exception. *See* Final Act. 8–9; Ans. 8–9.

As discussed above, there is no improvement to the claimed computing elements of a user interface, computer program, computer based simulator, and processor system, or any purported improvement to the technical field of modeling of scenarios for simulation. As also discussed above, the Specification indisputably shows the claimed computing system was conventional at the time of filing. *See supra*; Spec. ¶¶ 90–95. The Appellant provides no argument, reasoning, or evidence to the contrary. Accordingly, the evidence supports the Examiner's position that, beyond the judicial exception, claim 10 recites no more than well-understood, routine, or conventional features.

The Appellant also does not offer additional reasoning or argument why claim 10 provides an inventive concept or "[a]dds a specific limitation or combination of limitations that [is] not well-understood, routine, conventional activity in the field, which is indicative that an inventive concept may be present." 2019 Revised Guidance, 84 Fed. Reg. at 56. The claimed off-the-shelf computer program and generic processor operate in their ordinary and conventional capacities to perform the well-understood, routine, and conventional functions of implementing a mathematical expression and determining a constraint value. *See* Spec. ¶¶ 90–95 (describing that the method can be performed with generic computer

elements); *Electric Power*, 830 F.3d at 1354–55 (generically recited gathering, sending, monitoring, analyzing, selecting, and presenting information did not transform the abstract process into a patent-eligible invention); *Two-Way Media*, 874 F.3d at 1339 (processing, routing, and controlling data, and monitoring the reception of data did not transform the abstract idea into something more).

Thus, we are not persuaded of error in the Examiner's determination that the limitations of claim 10 do not transform the claim into significantly more than the abstract idea.

We therefore sustain the Examiner's rejection under 35 U.S.C. § 101 of independent claim 10 and of dependent claims 11–16, for which the Appellant provides no separate argument.

Claim 17

The Examiner rejects claim 17 for the same reasons as for claim 10, from which claim 17 ultimately depends. *See* Final Act. 8. The Examiner determines that claim 17

> only provide[s] more detailed limitations of the abstract idea identified above (i.e., further define[s] . . . the scenario of conditions is changed by optimizing a plurality of constraints using constraint programming; the at least one objective comprises at least one training objective; and the plurality of conditions comprises one condition selected from the group consisting of: a length of the scenario of conditions, and a quantity of the plurality of conditions), which do not make the abstract idea any less abstract.

Id. at 9. Additionally, the Examiner determines that "these elements do not offer meaningful limitations beyond generally linking the identified abstract idea(s) to a particular technological environment, that is, via computers." *Id.*

Viewing the elements as an ordered combination, the Examiner determines that they "add[] nothing that is not already present when looking at the limitations individually. While [claim 17] . . . may have narrower scope than the representative claim, [it does not] . . . contain[] an 'inventive concept' that transforms the corresponding claim into a patent eligible application of the otherwise ineligible abstract idea." *Id.* In the Answer, the Examiner elaborates further and asserts that "constraint programming is recited at a high level of generality. Furthermore, changing the scenario of conditions according to the parameters claimed is an activity that would be reasonable and practical to be performed by one human observing another and as a mental process by a human thinking." Ans. 26.

Claim 17 requires that the presented scenario of conditions is changed automatically based on the actual condition by optimizing constraints using constraint programming, and further narrows the type of objective to a training objective and the type of condition to a length of the scenario of conditions and a quantity of the plurality of conditions. Appeal Br. 42 (Claims App.).

The Appellant argues that the Examiner's "rejection shows no evidence of a meaningful consideration of the additional limitations individually or in combination." Appeal Br. 31. We disagree, as the Examiner considers claim 17 with claim 10 and provides adequate analysis. Further, the Appellant does not provide specific argument regarding how or why the additional limitations would change the Examiner's determinations.

The Appellant further argues that "like the claims of *McRO*, the incorporation of specific details for the conditions of the scenario further removes the recited solution from a generic computer performing generic

computer based functions." *Id.* at 32. However, in *McRO*, the claims were directed to a specific improvement in computer animation and used rules to automate a subjective task of humans to create a sequence of synchronized, animated characters. *See McRO*, 837 F.3d at 1314–15. Unlike *Flook*, *Bilski*, and *Alice*, it was not the use of the computer, but the incorporation of these specific rules that improved an existing technological process. *Id.* at 1314. Here, unlike with claim 1, the Appellant does not assert or provide reasoning how claim 17 recites a purported improvement in the technical or technological aspects of presenting or optimizing or to the technical field of modeling scenarios for simulation. To the extent constraint programming is performed, the claim does not recite a specific way of constraint programming, and the Specification discusses that general constraint programming is a known tool. *See* Spec. ¶¶ 46, 47. The Appellant also does not direct our attention to anything in the Specification to indicate that the invention as recited in claim 17 provides a technical improvement in the presenting of changing scenarios, monitoring, and determining steps of claim 17, or that claim 17 provides a purported improvement to a technical field, similar to the claims in *McRO*.

We therefore sustain the Examiner's rejection under 35 U.S.C. § 101 of dependent claim 17.

<div align="center">CONCLUSION</div>

The Examiner's decision to reject claims 1–5, 7–9, and 18–22 under 35 U.S.C. § 101 is not sustained.

The Examiner's decision to reject claims 10–17 under 35 U.S.C. § 101 is sustained.

In summary:

Claims Rejected	35 U.S.C. §	References/Basis	Affirmed	Reversed
1–5, 7–22	101	Eligibility	10–17	1–5, 7–9, 18–22

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED IN PART